This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1. (Previously Presented) An apparatus operable to provide damping between a sprung mass and an unsprung mass, comprising:

a linear to rotary conversion mechanism comprising a translatable member, having a first attachment point, and, adapted for generally linear translation in a forward and a reverse direction and a rotatable member comprising a rotatable shaft that is rotatably coupled to the translatable member; wherein translation of the translatable member in one of the forward or the reverse directions produces a forward or a reverse rotation of the rotatable member and shaft, respectively; and

a damping mechanism comprising a second attachment point, a hub that is fixed to the shaft, a means for generating a single electromagnetic field in response to an applied electrical signal that may be continuously varied in response to an input signal that is representative of a desired damping force and a fluid having a viscosity that may be continuously varied by application of the electromagnetic field that is in touching contact with the hub, wherein application of the variable electromagnetic field to the fluid produces changes in the viscosity of the fluid that in turn provides variable resistance to rotation of the hub and translation of the translatable member.

2. (Previously Presented) The damping apparatus of claim 1, wherein the fluid is a magnetorheological fluid.

3. (Previously Presented) The damping apparatus of claim 2, wherein the means for applying the single electromagnetic field is a coil that is located proximate the hub and magnetorheological fluid.

4. (Previously Presented) The damping apparatus of claim 3, wherein the translatable member comprises a ball nut and the rotatable member comprises a ball screw.

5. (Withdrawn) The damper of claim 3, wherein the translatable member comprises a rack and the rotatable member comprises a pinion.

6. (Previously Presented) An apparatus operable to provide damping between a sprung mass and an unsprung mass, comprising:

a translatable member that is adapted for generally linear translation in a forward and a reverse direction, and, having a first attachment point;

a rotatable member comprising a rotatable shaft that is rotatably coupled to the translatable member; wherein translation of the translatable member in one of the forward or the reverse directions produces a forward or a reverse rotation of the rotatable member and shaft, respectively;

a damping mechanism comprising a second attachment point, a housing having a first end with a bore that is adapted to rotatably receive the shaft therethrough, a sidewall having an inner surface and a second end, a hub fixed to the shaft and having an outer surface proximate a portion of the inner surface of the sidewall such that the outer surface of the hub and sidewall of the housing define a channel therebetween, a means for generating a single electromagnetic field within the channel, and a fluid located within the channel having a viscosity that can be varied by application of the electromagnetic field.

7. (Previously Presented) The damping apparatus of claim 6, wherein the fluid is a magnetorheological fluid.

8. (Previously Presented) The damping apparatus of claim 7, wherein the means for applying the single electromagnetic field within the channel is a coil that is located proximate the channel.

9. (Previously Presented) The damping apparatus of claim 8, wherein the translatable member comprises a ball nut and the rotatable member comprises a ball screw.

10. (Withdrawn) The damper of claim 8, wherein the translatable member comprises a rack and the rotatable member comprises a pinion.

11. (Previously Presented) An apparatus operable to provide damping between a sprung mass and an unsprung mass, comprising:

a translatable member that is adapted for generally linear translation in a forward and a reverse direction, and, having a first attachment point;

a rotatable member comprising a rotatable shaft that is rotatably coupled to the translatable member; wherein translation of the translatable member in one of the forward or the reverse directions produces a forward or a reverse rotation of the rotatable member and shaft, respectively;

a damping mechanism comprising a housing having a second attachment point, a first end with a bore that is adapted to rotatably receive the shaft therethrough, a sidewall having an inner surface and a second end, a hub having an outer surface that is fixed to the shaft and located within the inner surface of the sidewall such that the hub and sidewall form a channel therebetween, a means for generating a single electromagnetic field within the channel, and a fluid located within the channel having a viscosity that can be varied by the application of the electromagnetic field.

12. (Previously Presented) The damping apparatus of claim 11, wherein the fluid is a magnetorheological fluid.

13. (Previously Presented) The damping apparatus of claim 12, wherein the means for applying the single electromagnetic field within the channel is a coil that is located proximate the channel.

14. (Previously Presented) The damping apparatus of claim 13, wherein the translatable member comprises a ball nut and the rotatable member comprises a ball screw.

15. (Withdrawn) The damper of claim 13, wherein the translatable member comprises a rack and the rotatable member comprises a pinion.

16. (Previously Presented) The damping apparatus of claim 13, wherein the hub comprises a cylindrical base having an outer rim and that is fixed to the shaft and a cylindrical wall extending from the outer rim and located adjacent to the inner surface of the sidewall of the housing, wherein a first portion between the sidewall of the housing and the cylindrical wall of the hub comprises the channel.

17. (Withdrawn) The damper of claim 16, wherein the sidewall has a recess in the inner surface and the coil is located within the recess.

18. (Previously Presented) The damping apparatus of claim 16, wherein the cylindrical base of the hub comprises a non-magnetic material and the cylindrical wall of the hub comprises a magnetic material.

19. (Previously Presented) A damping apparatus, comprising:

a translatable member that is adapted for generally linear translation in a forward and a reverse direction;

a rotatable member comprising a rotatable shaft that is rotatably coupled to the translatable member; wherein translation of the translatable member in one of the forward or the reverse directions produces a forward or a reverse rotation of the rotatable member and shaft, respectively;

a damping mechanism comprising a housing having a first end with a bore that is adapted to rotatably receive the shaft therethrough, a sidewall having an inner surface and a second end, a hub having an outer surface that is fixed to the shaft and located within the inner surface of the sidewall such that the hub and sidewall form a channel therebetween, a means for generating a single electromagnetic field within the channel, and a fluid located within the channel having a viscosity that can be varied by the application of the electromagnetic field;

wherein the fluid is a magnetorheological fluid;
wherein the means for applying the single electromagnetic field within the channel is a coil that is located proximate the channel;
wherein the hub comprises a cylindrical base having an outer rim and that is fixed to the shaft and a cylindrical wall extending from the outer rim and located adjacent to the inner surface of the sidewall of the housing, wherein a first portion between the sidewall of the housing and the cylindrical wall of the hub comprises the channel, and, further comprising a lower seal and an upper seal for sealing the fluid in the channel, said lower seal located between the first end of the housing and the hub and said second seal located between the second end of the housing and the hub.

20. (Previously presented) The damping apparatus of claim 16, further comprising a cylindrical core attached to the second end of the housing and extending along and adjacent to the cylindrical wall of the hub, wherein a second portion between the cylindrical wall of the hub and the cylindrical core further comprises the channel.

21. (Currently Amended) ~~The damping apparatus of claim 20,~~
An apparatus operable to provide damping between a sprung mass and an unsprung mass, comprising:

a translatable member having a first attachment point, and adapted for generally linear translation in a forward and a reverse direction;

a rotatable member comprising a rotatable shaft that is rotatably coupled to the translatable member; wherein translation of the translatable member in one of the forward or the reverse directions produces a forward or a reverse rotation of the rotatable member and shaft, respectively;

a damping mechanism comprising a housing having a second attachment point, a first end with a bore that is adapted to rotatably receive the shaft therethrough, a sidewall having an inner surface and a second end, a hub having an outer surface that is fixed to the shaft and located within the inner surface of the sidewall such that the hub and sidewall form a channel therebetween, a means for generating a single electromagnetic

field within the channel, and a fluid located within the channel having a viscosity that can be varied by the application of the electromagnetic field;

wherein the fluid is a magnetorheological fluid;

wherein the means for applying the single electromagnetic field within the channel is a coil that is located proximate the channel;

wherein the hub comprises a cylindrical base having an outer rim and that is fixed to the shaft and a cylindrical wall extending from the outer rim and located adjacent to the inner surface of the sidewall of the housing, wherein a first portion between the sidewall of the housing and the cylindrical wall of the hub comprises the channel; and,

a cylindrical core attached to the second end of the housing and extending along and adjacent to the cylindrical wall of the hub, wherein a second portion between the cylindrical wall of the hub and the cylindrical core further comprises the channel;

wherein the core has a recess in an outer surface and the coil is located within the recess.

22. (Previously Presented) The damping apparatus of claim 20, wherein the cylindrical base of the hub comprises a non-magnetic material and the cylindrical wall of the hub and the cylindrical core comprise a magnetic material.

23. (Previously Presented) A damping apparatus, comprising:

a translatable member that is adapted for generally linear translation in a forward and a reverse direction;

a rotatable member comprising a rotatable shaft that is rotatably coupled to the translatable member; wherein translation of the translatable member in one of the forward or the reverse directions produces a forward or a reverse rotation of the rotatable member and shaft, respectively;

a damping mechanism comprising a housing having a first end with a bore that is adapted to rotatably receive the shaft therethrough, a sidewall having an inner surface and a second end, a hub having an outer surface that is fixed to the shaft and located within the inner surface of the sidewall such that the hub and sidewall form a channel therebetween, a means for generating a single electromagnetic field within the channel, and a fluid

located within the channel having a viscosity that can be varied by the application of the electromagnetic field;
wherein the fluid is a magnetorheological fluid;
wherein the means for applying the single electromagnetic field within the channel is a coil that is located proximate the channel;
wherein the hub comprises a cylindrical base having an outer rim and that is fixed to the shaft and a cylindrical wall extending from the outer rim and located adjacent to the inner surface of the sidewall of the housing, wherein a first portion between the sidewall of the housing and the cylindrical wall of the hub comprises the channel, further comprising a lower seal and an upper seal for sealing the fluid in the channel, said lower seal located between the first end of the housing and the hub and said second seal located between the cylindrical core and the hub.

24. (Previously Presented) The damper damping apparatus of claim 13, wherein the hub comprises a cylindrical disk that is fixed to the shaft and the sidewall of the housing has a cylindrical recess that is adapted to receive the hub, and wherein a first portion between the sidewall of the housing in the recess and the hub comprise the channel.

25. (Previously Presented) The damping apparatus of claim 11, wherein the fluid is an electrorheological fluid.

26. (Previously Presented) The damping apparatus of claim 25, wherein the means for applying an electromagnetic field within the channel is a pair of electrodes that are located proximate the channel.

27. (Previously Presented) The damping apparatus of claim 26, wherein the translatable member comprises a ball nut and the rotatable member comprises a ball screw.

28. (Withdrawn) The damper of claim 26, wherein the translatable member comprises a rack and the rotatable member comprises a pinion.

29. (Previously Presented) The damping apparatus of claim 26, wherein the hub comprises a cylindrical base having an outer rim and that is fixed to the shaft and a cylindrical wall extending from the outer rim and located adjacent to the inner surface of the sidewall of the housing, wherein a first portion between the sidewall of the housing and the cylindrical wall of the hub comprises the channel.

30. (Previously Presented) A damping apparatus, comprising:

a translatable member that is adapted for generally linear translation in a forward and a reverse direction;

a rotatable member comprising a rotatable shaft that is rotatably coupled to the translatable member; wherein translation of the translatable member in one of the forward or the reverse directions produces a forward or a reverse rotation of the rotatable member and shaft, respectively;

a damping mechanism comprising a housing having a first end with a bore that is adapted to rotatably receive the shaft therethrough, a sidewall having an inner surface and a second end, a hub having an outer surface that is fixed to the shaft and located within the inner surface of the sidewall such that the hub and sidewall form a channel therebetween, a means for generating a single electromagnetic field within the channel, and a fluid located within the channel having a viscosity that can be varied by the application of the electromagnetic field;

wherein the fluid is an electrorheological fluid;

wherein the means for applying an electromagnetic field within the channel is a pair of electrodes that are located proximate the channel;

wherein the hub comprises a cylindrical base having an outer rim and that is fixed to the shaft and a cylindrical wall extending from the outer rim and located adjacent to the inner surface of the sidewall of the housing, wherein a first portion between the sidewall of the housing and the cylindrical wall of the hub comprises the channel, and, further comprising a lower seal and an upper seal for sealing the fluid in the channel, said lower

seal located between the first end of the housing and the hub and said second seal located between the second end of the housing and the hub.

31. (Previously Presented) The damping apparatus of claim 29, further comprising a cylindrical core attached to the second end of the housing and extending along and adjacent to the cylindrical wall of the hub, wherein a second portion between the cylindrical wall of the hub and the cylindrical core further comprises the channel.

32. (Previously Presented)
A damping apparatus, comprising:

a translatable member that is adapted for generally linear translation in a forward and a reverse direction, and, having a first attachment point;

a rotatable member comprising a rotatable shaft that is rotatably coupled to the translatable member; wherein translation of the translatable member in one of the forward or the reverse directions produces a forward or a reverse rotation of the rotatable member and shaft, respectively;

a damping mechanism comprising a housing having a second attachment point, a first end with a bore that is adapted to rotatably receive the shaft therethrough, a sidewall having an inner surface and a second end, a hub having an outer surface that is fixed to the shaft and located within the inner surface of the sidewall such that the hub and sidewall form a channel therebetween, a means for generating a single electromagnetic field within the channel, and a fluid located within the channel having a viscosity that can be varied by the application of the electromagnetic field;
wherein the fluid is an electrorheological fluid; wherein the means for applying an electromagnetic field within the channel is a pair of electrodes that are located proximate the channel; and,

wherein the hub comprises a cylindrical base having an outer rim and that is fixed to the shaft and a cylindrical wall extending from the outer rim and located adjacent to the inner surface of the sidewall of the housing, wherein a first portion between the sidewall of the housing and the cylindrical wall of the hub comprises the channel, and,

further comprising a cylindrical core attached to the second end of the housing and extending along and adjacent to the cylindrical wall of the hub and the cylindrical core further comprises the channel; and,

further comprising a lower seal and an upper seal for sealing the fluid in the channel, said lower seal located between the first end of the housing and the hub and said second seal located between the cylindrical core and the hub.

33. (Previously Presented) The damping apparatus of claim 26, wherein the hub comprises a cylindrical disk that is fixed to the shaft and the sidewall of the housing has a cylindrical recess that is adapted to receive the hub, and wherein a first portion between the sidewall of the housing in the recess and the hub comprise the channel.

34. (Previously Presented) The apparatus of claim 1, wherein the sprung mass comprises a vehicle chassis.

35. (Previously Presented) The apparatus of claim 1, wherein the unsprung mass comprises a vehicle wheel.

36. (Previously Presented) The apparatus of claim 35, wherein the unsprung mass further comprises a vehicle axle.